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PHONATION *Compliments*
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Presented to the Section on Laryngology and Otology, at the Forty-ninth
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
PHONATION.

For thirty years there has seemed to me no difference between phonation (speech) and cantation (song), save in the length of the basic vowel sounds. The action of the nares, antra, pharyngeal dome, frontal sinuses, lips, teeth, tongue, soft and hard palates, epiglottis, breath-bands (false vocal cords), arytenoid cartilages, interarytenoid band, trachea, lungs, diaphragm, ribs, abdominal muscles and air are the same in both—or to shorten this text, the “oripulations” (*os*=mouth, *plenum*=full) are alike in both. Indeed, as the writer showed in a paper published in 1873, “speech may be termed staccato song.” A year later this view was published as original in London by an English observer. And now the serrations on the cylinders of the phonograph or gramophone have demonstrated the truth of this position, so that the kinship of phonation and song is proved. These things being so, the writer has thought for many years to ask the question: *Why not phonational harmony as well as musical harmony?*

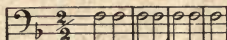
It seems fit to make this query in this Section, as without laryngology and otology it is impossible to understand this subject, and because the writer’s knowledge has mostly come from autolaryngoscopy and autorhinology. It makes no difference if medical doctors as a whole are among the poorest speakers. Phonation is a physiologic function belonging to the wide domain of medicine. Our country would be much better off if there were less lawyers in legislative bodies and more physicians there who could rise

to the true dignity of their oratoric birthrights. Having looked in vain to the professors of music, law, theology, oratory, physics and physic, the writer presents these ideas in the hope that some of the legion of distinguished younger throat specialists may perfect them, to the good of man.

Starting out with these views and also with the sentiments that phonation means the gift or communication of something of more or less importance by the medium of speech to other minds, and that a diminution of this full gift means loss and disappointment—if you pay \$1 to hear a speech, and the speaker or auditorium is so faulty that you hear only 75 per cent., it follows that you have been defrauded of 25 cents—the writer suggests that *speech should be in the chords of the keynote of the auditorium*, because Helmholtz, a double doctor of physics and physic, averred that every room has its keynote and because music, whose keynote is the same as that of the auditorium where it is produced, is the most effective and at its best.

For example, the church auditorium of my boyhood had as a keynote F.  Music in F sung or played in that church went with a rhythm and vim that roused enthusiasm and made the walls ring joyously. In 1850 Mr. Simmons, the organ-builder, while setting up a new instrument in this auditorium, was voicing the 16-foot open diapason pedals. He had much trouble with the F pipe. A Yale student home on vacation watched him for hours. Do what he could, Mr. S. was unable to give an even temperament to the scale. He would play C, D, E, F, G, A, B, C, over and over again and adjust the voicing. It was smooth and even throughout, except the F or Fa pipe, which would stick out like double great primer type among pica. Forty years afterward the student found that the trouble was because F was the keynote of the auditorium, as it is of the majority of auditoriums, according to the writer's experience.

Having found the musical keynote of the auditorium it is easy to find the phonational keynote. For example, take the above auditorium, sing the bass as follows: 0=60 metronome.



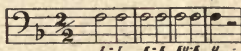
While with ceaseless course the sun.

Then sing the same staccato—




While with ceaseless course the sun.

and quicken the time in repeat if you do not catch the idea. You will then have phonation with rests between each syllable. Leave out the rests and you will have ordinary speech in the key of F. Perhaps the definition of phonation should be "staccato song without rests," if such a thing is possible in nomenclature. If the accomplished members of this Section will study this phase on their own vocal bands, I think it will be understood, with this reservation—it is impossible to sing words with the living vocal cords exposed to view in the laryngoscope, because the vowel sounds only can be sung. For example, the above phrase would be:



so that you can only use the larynx under sight or view as you play an organ or violin. Laryngoscopic song is simply playing as on an instrument. Hence we iterate, speech should be in the keynote of the auditorium, not necessarily on the keynote all the time; but that speech should have a keynote the same as in song, and melodiously depart from it, returning to the keynote or its chord at the end.

Take "Maxwellton Braes are Bonnie." It begins with the third chord of the key of C, runs down to C, then jumps an octave and ends the first line on A in the key of F. But in the next line the song immediately comes down to G, the fifth chord from C, and so this melody

runs in a most natural, easy and graceful style and ends on the keynote C. Now, when speech has the beautiful musical progression of this most exquisite but beautiful gem of Scottish song—which my son, Prof. Benjamin Cutter, of the New England Conservatory of Music, pronounces to be one of the most admirable of all secular songs—then phonation will produce the delightful effects of musical speech sometimes heard and long remembered. Thus phonation will be intelligible, easy to utter, easy to listen to, and not tiresome to hearer nor speaker. This opinion is based on facts like the following: In 1888 the writer had a paper to read before the AMERICAN MEDICAL ASSOCIATION, Section of Medicine, whose auditorium was a music hall with a holding capacity of 6000 people at least. About one hundred and fifty to two hundred men were present. Fortunately the keynote F 

was struck and held, as confectioners use a string for rock candy crystals that cluster in a chain of prisms. A critic present said that the address was heard perfectly and easily. The speaker got rested from his lantern demonstrations, which had taken most of the day up to 5 P.M. and tired him so that when he began to phonate, his knees almost collapsed under him. This severe test is worthy of evidence here.


At the meeting of the British Medical Association, held in Leeds in 1889, the writer was a delegate from the AMERICAN MEDICAL ASSOCIATION. A banquet was held in Albert Memorial Town Hall—700 plates. In this auditorium, as usual, the architects had catered for the eye, with magnificent walls and pillars of polished variegated marbles, and had given besides, a general visibility of the platform to the whole audience. But so sadly had the architects neglected the ear as to make it almost impossible to hear what was said by the phonators. The fault did not all lie with the construction of the hall as, to repeat, it is notorious that physicians are usually sorry public speakers. The writer was unexpectedly called on to respond to the

toast for foreign guests. Now, thought he, is the chance to test this rule of phonation. Hence, the main effort was to hit the keynote of the auditorium, making the words secondary. This effort took away all stage fear and made the speaker feel very much at home before the brilliant audience. He said: "The delegate from the largest medical society of the new world brings greetings to the largest medical society of the old. Peace and good will; our hearts are with you. Long may you prosper"—and then the speaker was interrupted by a sudden bursting of a storm and din of applause, which certainly proved that this principle of phonation was correct. It is needless to repeat the rest of the address, but it may be said that it was the last speech of the evening, when all were tired out, and that several gentlemen came to the speaker afterward, shook hands most cordially and thanked him for his speech, all saying, "because we could hear what you said!"


At the Tenth International Medical Congress, held in Berlin in 1890, the writer read five papers and made one address in the Section rooms, which were the salons of a picture gallery, constructed for the eye and not for the ear. Consequently it was very difficult to hear, and there was a habit of the uninterested, because not understanding, listeners of leaving during the exercises. The rule laid down about phonation was applied here, and if interested and continued attention of the audience is any criterion, speech in the chords of the keynote of the auditorium was a success. In some respects this was the severest test, because of its varied application and its uniform satisfactoriness.


Another rule which I venture to lay down is that *architects build auditoriums for the ears primarily and for the eyes secondarily.*

What does "auditorium" mean? A place for hearing! How oft it is the place for not hearing! One such is at Saratoga, of bad repute for hearing. But even in this auditorium when empty—which is deemed

worse than when full of people—I found that phonation in  was easily audible. There are two ways in which architects can get at this:

1. The concrete. Taking auditoriums which are known to be easy to sing and speak in. Such a one is the auditorium of the first Congregational Church, Woburn, Mass. The late John Stevens of Boston, its architect, told me that he had put the best work of his life into it and wanted it to be his monument. He certainly favored the ear and eye both. There is not a seat of the fifteen hundred but commands a perfect hearing and view of the preacher or speaker at the pulpit. Prof. Alonzo L. Butterfield, Ph.D., of Boston, elocutionist, enthusiastically wedded to his profession, after specially testing during a visit made for this purpose, pronounced it to be the best auditorium for phonation he ever met with. Clergymen have testified to the same; singers also. For several years the writer was a tenor in the choir and soloist. It

was easy to reach  while at the dedication of

this church the soprano soloist easily ran up to 

Thus, incidentally, is shown the advantage of an aurally correct auditorium for musical and phonational performances. Major Ambrose Bancroft of Woburn, Mass., master carpenter, has given me the following dimensions of the auditorium: Height of ceiling from floor, 34 feet 10 inches; width, 80 feet; length, 150 feet; width of side galleries, 11 feet; width of rear galleries, 14 feet.

The chapel of the New York City Church of the Comforter is easy for the ear. The auditorium is 25 by 50 feet, open to the roof; height of ridge pole, 18 feet.

2. Ideal. Study the nodes of the key of F, for example, and have the walls and height correspond to them.


In an auditorium already complete with organ, let the organist play the pedal notes singly till the keynote is found, then walking in the direction of the long diameter of the auditorium, note when the tone is loudest and weakest. In the Woburn church, I found the node of the keynote to be about fifteen feet. Such physicists as Prof. J. Solis Cohen, M.D., Prof. ~~N~~ F. Barker, M.D., University of Pennsylvania, and others, would, I think, gladly aid architects in this humane work.



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

While I would have orators trained for speaking in the chords of the keynote of auditoriums, I would also insist on architects following the example of the late John Stevens, aforesaid, and give us auditoriums that will be things of aural and optical joy, beauty and delight as long as they endure. But when architects build solely for the eye, come out and say so, eschewing all use of the ear, and when nine out of ten of their buildings will be an abomination to all who go to hear what is said or sung, it is high time to call a halt and compel them to take counsel of the experts named, and furnish better construction.

The following is a study in phonational harmony to illustrate the recommendations given: Matthew ix, 27-38, inclusive. *Speech parts*: 1, text; 2, blind men; 3, Jesus Christ; 4, the multitudes; 5, Pharisees.


It is natural that these parts should be in different tones. Voices differ as much as speakers. Taking the New England (Boston) Conservatory of Music scale, where A in the treble clef has 432 vibrations per second, it is evident that 1 could use 423 vibrations to the second; 2 could use 433; 3 could use 434; 4 could use 435; 5 could use 436 vibrations to the second of time, if they chose to; even fractions of these numbers they could use. But for our purpose of illustration let us use the chords of F, i. e., 5 below—1:3:5:8.


Or using male voices, let the text, 1, be  F;


2, blind men be  F; 3, Jesus  A; 4, mul-


titudes  C; 5, Pharisees  C.


Dispensing with verses, the phonational harmony might be as follows:


1.  And when Jesus departed thence two blind men (2) followed him crying and saying:


2.  Thou, Son of David, have mercy on us.


1.  And, when he was come into the house, the blind men came to him, and Jesus (3) saith unto them:


3.  Believe ye that I am able to do this?


1.  They said unto him,


2.  Yea, Lord.

1.  Then touched he their eyes, saying:


3.  According to your faith be it unto you.


1.  And their eyes were opened and Jesus straitly charged them saying:


3.  See that no man know it.


1.  But they, when they were departed,


spread abroad His fame in all that country. As they went out behold, they brought to Him a dumb man possessed with a devil. And when the devil was cast out, the dumb spake and the multitudes marvelled, saying:

4.  It was never so seen in Israel.

1.  But the Pharisees said:


5.  He casteth out devils through the Prince of devils.



1.  And Jesus went about all the cities and villages, teaching in their synagogues and preaching the gospel of the kingdom, and healing every sickness and every disease among the people. But when He saw the multitudes He was moved with compassion on them, because they fainted, and were scattered abroad as sheep having no shepherd. Then saith He to His disciples:

3.  The harvest, truly, is plenteous; but the

laborers are few. Pray ye, therefore, the Lord of the harvest that he will send forth laborers into His harvest.

This may be chanted or intoned, the reader following the musical pitch; then sung staccato; next, staccato without rests. While speech may vary like song, from the keynote, still, speech should close on the keynote or its chords like song. Often have I heard male speakers close on the minor third octave below. Thus,

taking  for keynote, the last few words were

spoken in  and the final word in  a thing,

I think, not allowed in song harmony, and which leaves a very bad impression on the audience, unless it is a funeral service, and even then I doubt its propriety.

Finally, the rule for phonation in the chords of the keynote of the auditorium is not exactly new. My classmate at Yale, U. S. Senator W. M. Stewart of Nevada, told me that whenever he spoke in a new place he had a man stand at the remotest part of the auditorium who would raise his hand above his breast when the pitch was too high, and below his breast when the pitch was too low; but when it was right and the audition was perfect, the man would hold his hand at his breast, still. The senator would then adhere to that pitch as his central thread of utterance. I think it was he who said that Cicero did the same thing. But the Senator said that he did not know before that the pitch was the keynote of the auditorium that they were after in phonation.

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